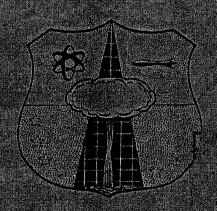


# HEADQUARTERS AIR FORCE SPECIAL WEARONS CENTER AIR FORCE SYSTEMS COMMAND KIRTLAND AIR FORCE BASE, NEW MEXICO



AFSWCIB CAPABILITIES IN LIGHT OF RESUMED NUCLEAR TESTING

25 September 1961

**DECLASSIFIED WITH DELETIONS** Authority E.O. 12958 05 amended DOEZONOOGUSTEH

Prepared by

Plans Division DGS/Operations

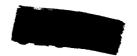
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**Report Documentation Page** 

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# OUTLINE

Technical Requirements

**Genter Recapitulation** 

Research Directorate

Development Directorate

Support Requirements

\* NOTE: Technical Requirements are spelled out for three Categories.

Category I Existing Requirements which are Independent of Nuclear Tests

Category II Additional Requirements for Operation NOUGAT (Underground only)

Category III Additional Requirema "is for Operation NOUGAT - with Atmospheric Tests





# **SYNOPSIS**

This paper presents an analysis of the technical and support capabilities of the Air Force Special Weapons Center in light of the resumption of nuclear testing. The resumption of nuclear tests on either a limited or unrestricted basis will increase the AFSWC workload across the board due to:

- a. Nuclear effects tests to study space effects (communications and kill mechanisms) and surface and atmospheric effects (hardening, electromagnetic and biomedical).
- b. Weapons development tests will result in new weapons, subsystems, safety studies, and systems integration work.

The capability of AFSWC to provide Air Force support of nuclear tests in accordance with ARDCR 23-11 has been dissapated as a result of deactivation of the 4950th Test Group (Nuclear). Resources required for the support of nuclear tests are dependent on restrictions placed on tests (i.e. underground, space and/or atmospheric).





AESWC TECHNICAL MANPOWER REQUESMENTS

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AFSWC TECHNICAL MANPOWER REQUIREMENTS



### Development Directorate

#### a. Safety Analysis and Development Division

I -- The requirement for mempewer resources has been documented in the following AFSMC letters: (1) AFSMC letter, subject: "Request for Hempewer Spaces for Meelear Safety," dated 9 Jume 1961, and (2) AFSMC letter, subject: "Nuclear Beaster Safety Program," dated 21 September 1961. This requirement has become more critical since the above letters were forwarded due to the over increasing backles of analyses and studies which have been beyond the capabilities of AFSMC to perform.

	Officers	Airman	<u>Giviliana</u>	Potal
Nuclear Weapens Safety Effort	18	•	2	20* .
Reclear Reactor Safety Effort	4	•	1	See

- \* 13 of the initial requirements for 33 spaces have been provided from within AFSMG resources, leaving a requirement for 20 additional spaces.
- \*\* Six of the initial requirements for 11 spaces have been provided from within APSMS resources, leaving a requirement for five additional spaces.
- II & III -- No additional manpower required.

#### b. Verpone Development Division

I -- Summarizing succeeding paragraphs, the total requirements associated with approved and proposed vulnerability efforts are:

Officers	Airmen	Civiliane	Total
19	6	3	22

The initial requirement for manpover resources to implement applied research effort in Valnerability, as proposed by APSMC and approved by Mondquarters APSC, as Project 8809, is documented in the Form 613 as follows:

Officers	Airmen	Civilians	Total
7	0	•	7







If the Vulnarability Sourcebook effort, approved by the Technical Advisory Fanal (TAF) of the Joint AEC-BOD Vulnerability Board, is levied on AFSWG, as has formally been indicated, an <u>additional</u> manpower requirement exists as follows: Reference AFSWG letter (SWD), to Eq AFSC (SGS 6 SCT), dated 20 Sep 61, subject: (U) "AFSWG Support of TAF in Development of Vulnerability Criteria Sourcebook."

Officers	Airmen	Civilians	Total
4	0	1	5

In addition, in order to implement the specifically defined Air Force directed program recently proposed to the Joint AEC-BOD Vulnerability Board in Washington and for which AFSWC is designated as the cognizance agent, further augmentation of the Vulnerability effort will be necessary as follows:

Officers	ALUMAN	Civiliana	Total
8	0	2	10

II -- In order to assure prompt integration of Air Force weapon system nuclear vulnerability requirements into a nuclear testing program such as MOSGAT it will require additional manpower. As a minimum, the functions of these people will be: (1) Maintain continuous cognisance of USAF Nuclear Weapon System Vulnerability needs which might be solved or initiated by means of live nuclear tests. (2) Assure recognition of these needs through existing channels for stating these requirements both within AEC and DOD. (3) He technically competent to assure proper design of tests necessary to determine required information. (4) Assure prompt integration of test results into all appropriate weapon system efforts and vulnerability agencies.

To satisfy these functions for an operation of magnitude comparable to that proposed in NOUGAT would require the following:

Officers	Almen	Civilians	Intal
4	O	1	5

III -- To support the USAF requirements for Vulnerability, weapon development efforts, instrumentation efforts, and integration of USAF requirements through AEC-BOD limited channels would require:

	Officere	Altman	Civiliana	Istal
	7	0	1	8
-				
		The second secon		



## e. Support Equipment Division

I -- None

II & III -- The impact of muclear testing upon the Support Equipment Division menifosts itself in two ways:

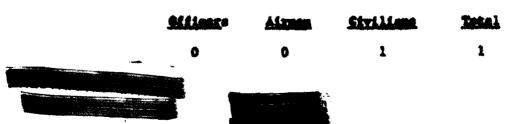
(1) The sajer effort will be the engineering support in the detailed planning, implementation, collection of data and analysis of the results of those tests directly or indirectly affecting the B-52/47, B-70, B-38, GAM-77/87, REMN's, F-100, F-102/106, F-104, F-105, GAM SIN, GAR-11 and RM-99 systems. The unjority of this engineering support will be tendered directly to the Acrespace Systems Division and the Meapons Development Division of the Development Directorate, APSMC. It appears that this support can beat be tendered by those engineers who are currently providing engineering support to those systems, since individual engineers sufficiently qualified in all aspects of these systems are not in emistence. After a critical enamination of the worklood and resources of the Support Equipment Division, it is anticipated that this increased effort will require a minister augmentation of entherized strength to the cutout of:

Milagra	Airme	Civiliana	Issal
6	0	3	9

(2) The second area of effort will be in the detailed planning, programming, implementation, etc., of tests of muclear effects on selected verson system components and subsystems for which this Bivision has primary development responsibility. Specific enamples of these are: (a) The Air Target Pune (currently used on the Bi-978 and programmed for the QAR-9 and BB-1. (b) The Passive Air Target Pune (a new Infra-Red func currently under consideration for the BB-1). (c) Electro-Emplosive devices representative of these used in release and separation systems and switch estuation devices. (d) High current solid state diedic representative of these used in emergency separation systems.

Items such as these would be selected since it is recognized that there is a possibility that the effects of a suclear explosion on these items night cause the inadvertent release, prenature detonation, or dudding of the carried weepen, even though such an explosion is beyond the range of a direct weapen or aircraft kill.

It is anticipated this effort will require a minimum argumentation of the Division's authorized strength by one technical civilian:





In summary, the increase in effort on the part of the Support Equipment Division in support of muclear testing of MUSAY or cimilar series would require a minimum augmentation of surrout authorized strength to the extent of:

Officers	ALTHOU	<u>Civiliana</u>	Istal
4	٥	<b>A</b>	10

### d. Acrospace Systems Division

I -- Home

II & III -- The resumption of nuclear testing dictates the Agreepase Systems Division assume the following additional functions: Provide Air Force representation as required, receive and collect test data, evaluate and analyse test results, provide conclusions and recommendations to appropriate Air Force agencies, and aid in implementation of weapon system changes dictated by test results.

The nuclear testing in progress will generate an increased workload for this Division in the openific areas defined in above, and is as follows:

Miles	ALCOHOL	Civiliana	Tetal
15	0	4	19

Modifications and changes to weepens and also weepen systems vill require re-evaluation of leading and delivery techniques. How technical data will be required for the following: fit checks, now configurations, ballistic delivery modes, and now operational concepts. The resultant changes and revisions to special weapon technical orders will impose an additional workload upon the Handbook Into Branch and requirement for the following:

Miles:	ALTHOU	Civiliana	Istal
٥	٥	3	3

For the GRNN project, three additional engineers are required in the Aerospace Systems Division to insure the orderly development of a Systems Flan and its implementation. The Test Flan and the management thereof will require rigid and constant supervision to insure that the facility requirements at the test site are fulfilled. Close coordination between all agencies either governmental or contractual will be unintained to insure that all requirements and specifications are adhered to. Engineering support will be required to unkn cortain that heréwere developed







for the proposed test completely fulfill the requirements levied as a result of Basic Baserah that has been accomplished. The Safety Baquirements associated with tests of the vehicle will be educated to insure that the stringent requirements of such an effort are fulfilled. This increase in workload will distate the need for the following:

officer.	Airman	Civiliane	Tetal
3	٥	1	4

In summary, the total Acrospace Systems Division requirements associated with MOMEAT and atmospheric testing are:

<u>Officers</u>	ALTERA	Civiliana	Intal
12	0	8	26

#### e. Muclear Power Division

I & II -- None

III -- Additional nonpower is required for determination of the vulnerability of space suclear auxiliary power systems to radiation and blast. The analysis of waspen data (bank debrie, etc.,) is also necessary for application to reactor reentry problems. The results of these analyses will be directly applicable to satallite systems containing nuclear our-tilary power units, such as MIRAS, SHAP SHOT, etc.

Officers	ASEROR	Civilians	Total
7	9	2	9







# 3. Research Directorates

### a. Analysis Division

I -- The space authorizations for the Analysis Division havebeen continually reduced over the past eighteen months primarily because of the low priority (85D) assigned to Project 7812. As a result only 10 spaces are currently authorized this function. As a result the following efforts were discontinued.

- (1) Support of AFADC in interpretation of test data from F106-AB-1 firings.
  - (2) Assistance to the Development Directorate in CLAW studies.
- (3) Study of "Dead-Kan Switch" concept for strategic weapon delivery.
- (4) Participation in SWV project "Proximity Fuzed NTA Rocket" (Modified AB-1 firings).
  - (5) Support of Blue Scout Computations.
- (6) Administration of BOSS (Boeing) contrasts and IR Guidance Degradation (Boeing) contracts.
  - (7) Calculation of Thermal Safe Escape Ranges.

With one man committed for full time work on plans for resumed nuclear testing and one committed to half time in RADON and quarter time on the weapons vulnerability program, the effective strength for application to analysis type studies is hardly sufficient to support one study effort.

There are presently 4 major studies to be accomplished as soon as possible. The AFSC directed study on Gigaton Application and Implication, a study in support of Physics Division on the application and implication of "Blackout" to AF systems, a continuance of the study on application of Orion type payloads, which is a task under Project 3775 and a continuance of the AFSC directed study on application and implication of Casaba/Howitzer. An interim report on the latter study is in publication form at present.

# Cat I (Required)

Officera 14	Airmen O	<u>Civiliana</u>	:	Intal 14	
Cat II & III	•				
0	. 0	•	•	0	



# b. Physics Division

The Physics Division workload has increased substantially in FY 62. The R&D contractual effort of the Division has increased from about 6.5 million in FY 61 to about 12.5 million in FY 62. In addition, preparation for meaningful use of the new Nuclear Warfare Laboratory will require a doubling of the in-house experimental effort by the end of FY 62. The additional effort for the lab should be programmed, starting immediately since detailed planning of experiments must precede actual occupancy and arrangement of experimental equipment. The increased contractual effort represents increased theoretical and experimental effort on X-ray, Argus, Blackout, EM pulse, transient radiation effects, re-entry vehicle and warhead vulnerability, bomb debris motion in high altitude environment and Project Orion.

Any reduction in the planned build up of the division will reflect directly on the Directorate ability to field meaningful experiments on nuclear tests, experiments which will verify and/or modify results of the present and planned theoretical and laboratory simulation program. One lesson learned in past years of nuclear testing was that very little useful information was gained on difficult nuclear experiments if adequate theoretical and laboratory effort had not proceeded the design of the experiment. Of equal significance is the fact that the theoretical and laboratory simulation effort will be the basis for system and operational planning without final verification if proper nuclear tests are not approved. Therefore it is imperative that the present and planned Physics Division program be adequately supported, tests or no tests.

- <u>Cat I</u>\*

Officers

Airmer

Civiliana

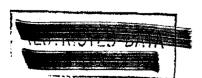
Total

\*Includes Project Orion FY 62 requirements independent of nuclear experiments.

Cat II

Deleted

In addition the division will conduct experiments to investigate "Casaba" feasibility, effects and to check out experimental techniques for planned nuclear experiments on Project Orion.







In addition during this period underground experiments for Project Orion may be approved. If so, additional manpower will be required to provide technical direction and management for the experiments. Assistance from the Development Directorate is expected. The asterisked numbers below indicate the increased manning necessary in the Research Directorate if Orion underground testing is permitted.

If manpower augmentation is not possible the following areas of work will be reduced by 19 man years for the FY 62 (independent of Project Orion considerations).

- (1) Nuclear sloud debris motion
- (2) Communication blackout
- (3) EM pulse phenomenlogy
- (4) Turbulent Argus
- (5) Fireball Blackout
- (6) Transient radiation effects

If testing an Orion is approved without manpower augmentation the reduction of effort in the above areas will be an additional 8 man years in FY 62.

	Officers	Airmen	Civiliana	Total
Nougat *Orion	17	0	2 1 .	19

#### Cat III

If reasonable yield Tetherd Balloon Shots are included in Mougat, the Physics Division will either be responsible for or involved in experiments concerning the EM phenomena and effects. This will be in addition to the Marshmallow experiments. If there is no manpower augmentation for this increased effort, the work enumerated in (1) thru (6) under Cat II will be reduced by an amount corresponding the manpower requirements shown below. If Nougat Balloon Shots are approved, it is reasonable to anticipate approval of the planned balloon shots for Project Orion, if so - manpower augmentation or corresponding reduction in the Physics program will be necessary. The esterisked numbers below indicate the requirements for Orion belloon experiments in addition to those shown in Cat II for Orion.

	Officers	Airmen	Civiliana .	Total
Nougat	3	0	•	3,
balloon #Orion	3	•	•	3







## c. Biophysics Division

- I. During the past year, limited manpower allocations has precluded accomplishment of programmed efforts in the following areas.
- (1) Plutonium reaction with exotic missile fuels in the event of accident in order to determine radiation hazards during such an eventuality.
  - (2) Pulse reactor simulation of weapon radiations.
  - (3) Neutron and gamma transport at all altitudes.
- (4) Support to Hq USAF in the preparation of new manuals and revision of existing manuals in the area of AF operation under nuclear environment.
- (5) Support to AF commands on operational problems dealing with the nuclear environment.
- (6) Maintaining cognizance and control of available radias instrumentation and developing new specialized radias instrumentation as required in the field and AF research laboratories.
- (7) Adequate support of radiation hazards experiments in tests of Pluto and Tory systems.
- (8) Timely analysis of Bio-astronautics data in support of man in space programs.
- (9) Support to the USAF Inspector General, Directorate of Nuclear Safety.

Officers Airmen Civilians Total
15 11 0 26

II. Participation in the Nougat series would consist of the following:

- (1) Close-in radiation spectrum from weapons detonations.
- (2) Radiation environment in hardened sites.
- (3) Investigation of the particulate plutonium exide in the event of non-nuclear yield.
- (4) Field test of presently constituted Air Ferce radias instruments.

Seven officers are required to support the Mougat series. However, since simulation efforts would be curtailed in order to support actual tests, so additional manpower will be required over and above the 26 in Gategory I.







III. If atmospheric testing is done, additional biomedical research efforts would be accomplished. These would include:

- (1) Incapacitating effects of radiation from low yield weapons.
- (2) Refinement of biological desimetry by comparison of depth dose versus air dose.
- (3) Plutonium inhalation hexards in the event of non-nuclear destruction of a weapon.

Officers

Airmen

Civiliana

Total

#### d. Structures Division

I. The Structures Division responsibilities has increased considerably for FY 62. Their contractual effort has increased from \$0.6 million in FY 60 to \$2.5 million in FY 62, will expand to 3.5 million in FY 63. In addition they are responsible for the technical program for the new 6° shock tube facility currently operated by the Univ. of New Mexico under contract. They have increasing responsibility for consultant and advisory service to BSD, ASD, ESD and the operating commands relative to protective construction. The division manning has increased only about 20% for a 200 to 300% increase in workload. Unless additional manpower can be authorized they will be unable to provide the consultant and advisory service to the AFSC divisions and major commands except on a minimal basis and less than satisfactory time scale.

Officers

Airmen

Civilians

Iotal 12

II. If Category I manpower were available the division could accomplish their participation in Nougat without additional spaces by shifting some emphasis from simulation to experimental effort on Nougat. If manpower is not increased the division will participate in the series but at the expense of technical management and direction of the contractual and reporting program.

Officers

Airmen

Civiliana

Ictal

III. The tetherd balloon shots on Nougat effer the first opportunity for badly needed experiments on air blast coupling. The yields and height of burst parameters will determine the extent of useful participation by the Structures Division. If conditions are right for reasonably high overpressures at the surface, an all out effort will be initiated to include meaningful experiments.

Officers 5 Airmen

Civillana

Ictal

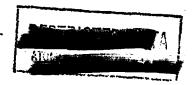




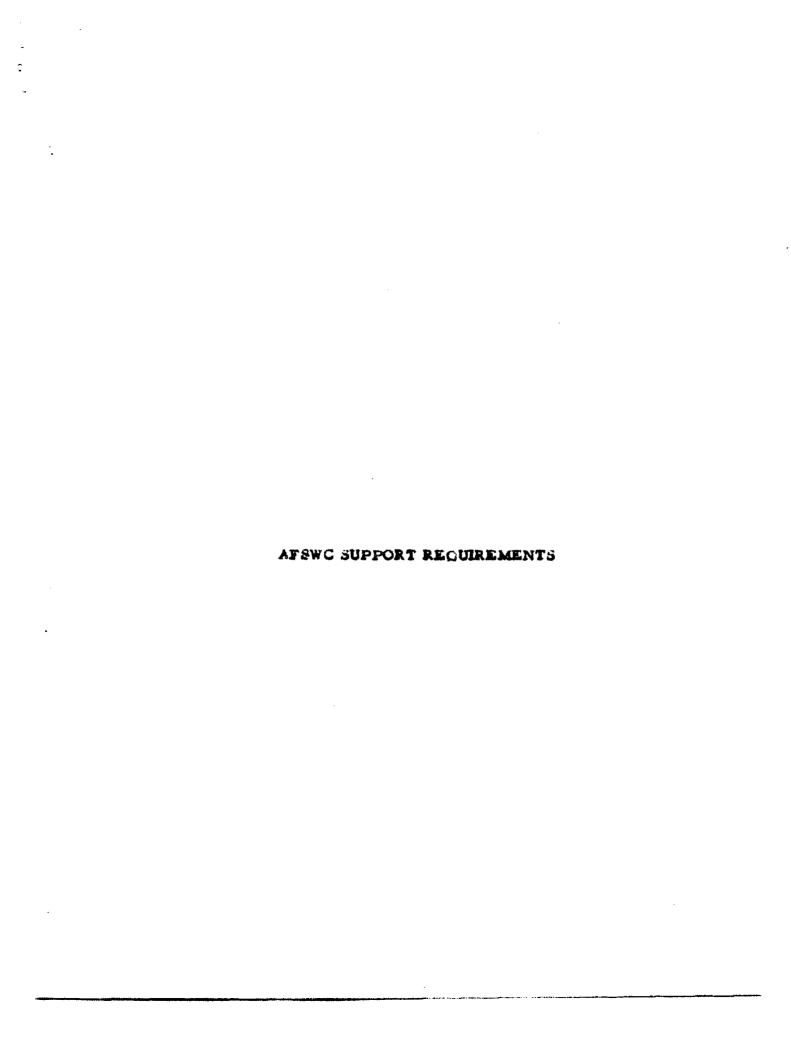
## e. Research Directorate Totals

I.	Officers 75	Airman 22	Givilians O	Total 97*
II.	27	0		30
III.	17	0	•	17

"This total is the minimum req ired to accomplish programmed work as described in the previous sub-paragraphs, including that referenced in the "Review of AFONC Manpower Requirements and Resources" dated 29 May 1961. This also includes the requirements for Structures research and Directorate of Nuclear Safety Research which have been the subject of separate correspondence.









### AIR SUPPORT REQUIREMENTS FOR

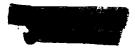
#### **OPERATION NOUGAT**

Initial air support requirements for operation NOUGAT are spelled out in a message from Commander, Field Command DASA, to Chief, DASA with info to AFSWC. This message (9-1-8370), dated 22 September 1961 was subsequently retransmitted to AFSC Head-quarters. This message stated the feasibility of accelerating Operating NOUGAT to maximum extent and the possibility of resuming atmospheric testing involving detonations similar to those of HARD-TACK II. This acceleration could take place on extremely short notice. The message stated that requirements will approximate the following:

- (1) Air Operations Center, Mercury Nevada,
- (2) Ground support augmentation at Indian Springs (possibly 200 to 250 qualified personnel.
- (3) B-57 support (cloud sampling) underground shot two plus one backup aboveground four plus two backup.
- (4) B-57 and/or T-33 aircraft for high altitude cloud tracking one aircraft plus one backup.
- (5) One suitable transport aircraft plus one backup for low altitude cloud tracking.
- (6) Liaisen aircraft for security sweeps liaison and photography two aircraft plus one backup.
- (7) Possibility of one C-54 plus one C-47 backup for device transport.
- (8) Air shuttle (Albuquerque to Indian Springs and return and other points as necessary) may be required to support the above.
- A letter has been received from Commander, Field Command DASA. This letter, attached, requests that an air support party be provided by the AFSWC to the NTS for the remainder of Operation NOUGAT.

The following resources are required to provide minimum support outlined above. These estimates are based on experience gained in HARDTACK II.







# AIR OPERATIONS CENTER

Ops Staff Officer	1416	1 Major
Staff Intercept Comptroller	1616	l Major
Intercept Comptroller	1644	1 Capt
Intercept Comptreller	1644	1 Lt
	TOTAL	4
Gr Radar Supt	30390	1 CMSgt
AC & W Maint Tech	30372	1 MSgt
AC & W Radar Repairman	30452	1 SSgt
Gr Com Maint Tech	30472	1 TSgt
Admin Clerk	70250	1 SSgt
	TOTAL	5

In addition, the following are required for overall coordination of air support activities at ISAFB:

Ops Staff Officer	1416 or 1435	(1) Major
Admin Clerk	70250	(1) SSgt
Dispatcher		(1) SSet

Two L-20 duty pilots are required for security sweeps, aerial photography and cloud tracking.

A Staff Communications officer should be available at the earliest opportunity to supervise installation and maintenance of the AN/USQ-12 equipment at the NTS, installation of communications between the Air Operations Center at the NTS and Indian Springs Operations; to obtain frequencies both UHF and VHF for use at the NTS; and to advise personnel at the NTS of power requirements, antenase requirements and lines.







This effort also requires an officer to act as OIC and senior coordinator, who may operate at the NTS, Indian Springs, or Kirtland,

# INDIAN SPRINGS AIR BASE SQUADRON

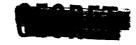
At the present time Indian Springs AFB is manned by 146 airmen, 12 civilians and 3 officers of the Tactical Air Command. These are not enough personnel to provide support for air operations during a test series. Through discussion with Major Marks, Squadron Commander, it cannot be emphasized strongly enough that in the event of future support requirements at ISAFB, augmentation of personnel to support and operate the base will be mandatory. This small operation was significant enough in size to preclude the accomplishment of their basic mission. In other words, at any time a requirement is imposed on this base over and above the normal gunnery range detachment activities, they are rendered incapable of performing their primary mission. To this extent, Lt Colonel Smith of Nellis AFB instructed Major Marks to fly no missions but rather to supply the L-20 aircraft and permit the AFSWC pilots to perform this duty

At the time Indian Springs AFB was transferred from AFSC to TAC, it was manned by 14 officers ( 160 airmen and 42 civilians). This strength was maintained during an interim period with no testing activity at NTS. Unit support equipment of the 1211th Test Squadron will need to be transported to the NTS in the early stages of the operation, as will other types of equipment, such as fork lifts, and decontamination trucks. This will call for manning support at Indian Springs at an early date. The base has no such capability at this time

During test periods, the Air Base Squadron was augmented to accommodate the additional workload. As an example, the following figures reflect peak manning strengths at Indian Springs during HARDTACK II. If atmospheric tests are allowed at NTS, which appears very likely, similar authorization will be required:

UNIT	PEAK	AVERAGE
Headquarters	18	11
4926th (Sampling)	<b>4</b> 9	37
4935th (Air Base)	251	251







UNIT	PEAK	AVER AGE
4935th (Air Base)	251	251
4952nd	67	53
Other	27	
	412	373

It is not yet clear whether TAC will continue to operate Indian Springs, or if ISAFB will be transferred back to AFSC (AFSWC). In either event, additional manning as outlined above will be required. The degree of manning is contingent on the scope of Operation NOUGAT. However, even if NOUGAT remains an underground series, some augmentation will be required.

# TRANSPORT AIRLIFT

Practically all of AFSWC's air transport aircraft and flying hours are SI coded to support CRT flying. The Center has just barely enough duty pilots assigned to provide instructor and supervisory capability for its CRT flying. In fact, two of these people have already had to be used as L-20 pilots in the earlier ANTLER and SHREW events. Aircraft and flying hours in the SI coded areas are very closely controlled. AFSWC will be able to provide airlift from its present capabilities at the outset, but a program such as outlined in the TWX will require the assignment of additional aircraft and primary duty aircrews, together with additional test support coded flying hours, and the maintenance capability to provide them.





FCWT1

SUBJECT: Air Support Party

TO: Commander

Air Force Special Weapons Center Kirtland Air Force Base, New Mexico

- l. Experiences during the ANTLER and SHREW events have shown the necessity for air controllers and coordinators at the Nevada Test Site during Operation NOUGAT. These personnel are required to control aircraft over the test site, provide staff assistance to the DOD Operations Coordinator, provide centralized briefings for air crews, and coordinate the administrative and logistical support of the test aircraft and crews.
- 2. Request that an Air Support Party be provided by the AFSWC to the NTS for the remainder of Operation NOUGAT.
- 3. This party should be capable of coordinating the operational activities of up to eight aircraft of various types, and should be capable of expanding this capability on short notice. One officer in this party will be used as a staff assistant to plan and coordinate aircraft participation in current and future tests at NTS. This individual should be a qualified operations officer capable of providing sound advice to the DOD Operations Coordinator and the Test Manager. Air Support Party operations are described in the AEC-NTS SOP, NTSO-0103-10 and NTSO 8808-01. Detailed operations will vary slightly from those outlined in the SOP. The majority of aircraft operations will take place during daylight. Aircraft will be based temporarily at Indian Springs Air Force Base, Nevada.
- 4. The Air Support Party should be prepared to perform its duties not later than 28 September 1961.

H. C. DONNELLY Major General, USAF Commander